



**FILED**

08/10/20  
04:59 PM

# Vehicle Grid Integration Implementation and the Draft Transportation Electrification Framework

## Energy Division Staff Paper

August, 2020

## Contents

Purpose .....	2
VGI Policy Background .....	2
Draft Transportation Electrification Framework .....	4
Senate Bill 676 .....	4
VGI Roadmap Update .....	4
Energy Division Staff Response to VGI Working Group Policy Recommendations .....	5
Cross-Cutting Policy Topics .....	5
Cybersecurity .....	5
Equity .....	6
Metrics .....	7
Process for Implementing VGI Near Term Priorities .....	7
Evaluation Process .....	8
Appendix –VGI Working Group Policy Recommendations and Energy Division Staff Feedback...	10
 Table 1. Policy Recommendation Categories .....	3
Table 2: Equity Recommendations .....	6
Table 3: Categories and Examples of Metrics .....	7
Table 4: VGI Working Group policy recommendations for the CPUC and Energy Division Staff Feedback .....	10

## Purpose

The purpose of this Energy Division staff paper is to supplement staff's draft [Transportation Electrification Framework \(TEF\)](#) with new information as a result of the Vehicle Grid Integration (VGI) Working Group Report issued in June 2020. This paper aims to:

- Provide staff recommendations from a VGI perspective on cross-cutting draft TEF topics including cybersecurity, equity, implementation process, and metrics;
- Provide information regarding which existing California Public Utilities Commission (CPUC) venue(s), if any, would be appropriate to consider the VGI Working Group policy recommendations that identify CPUC as the lead agency;
- Supplement staff's draft TEF with additional questions for parties to consider when providing comments including areas where parties could provide additional information or fill information gaps regarding VGI Working Group policy recommendations; and
- Identify policy recommendations that may be related to topics in the draft TEF but that staff believes are not timely for consideration now.

## VGI Policy Background

In August 2019, Energy Division staff launched the VGI Working Group with eighty-five participants. They included the California Air Resources Board (CARB); California Independent System Operator (CAISO); California Energy Commission (CEC); utilities including community choice aggregators; electric vehicle (EV) manufacturers; battery manufacturers; charging network and energy service providers; advocacy and research groups; industry associations; and ratepayer interest groups. The [DRIVE Order Instituting Rulemaking](#) (OIR) [R.18-12-006](#) tasked the VGI Working Group with addressing three questions:

1. What VGI use cases can provide value now, and how can that value be captured?
2. What policies need to be changed or adopted to allow additional use cases to be deployed in the future?
3. How does the value of VGI use cases compare to other storage or DERs?

The VGI Working Group identified many potential VGI benefits including, but not limited to:

- Lower the total cost of EV ownership and accelerate individual and fleet EV adoption – resulting in savings to owners - and avoid carbon and criteria pollutants;
- Reduce ratepayers' costs by reducing congestion on existing power distribution infrastructure, avoiding costly distribution system upgrades, and providing other grid services;
- Support further electric sector decarbonization by avoiding curtailment of renewables; and
- Improve grid resiliency and security.

The June 30, 2020 [VGI Working Group Report](#) provided 90 [policy recommendations](#) in response to the second question, including timing, relevant use cases, metrics and other information. The Working Group vetted each recommendation through discussion, surveys and qualitative feedback. Table 1 shows 11 categories containing the 90 recommendations, listed in the right column, that address a broad range of end goals, which are listed in the left column.

Table 1. Policy Recommendation Categories

End Goal	Policy Recommendation Category (and related VGI Working Group Policy Recommendations) <sup>1</sup>
Market signals create market demand	1. Reform retail rates (1.01, 1.02, 1.04, 1.05, 1.06, 1.07, 1.08, 1.09, 1.10, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.20 and 6.04) 3. Design wholesale market rules & access (3.01, 3.03, 3.04, 3.05, 3.07 and 2.01)
Demonstrate early stage technology development and evaluate data to show market readiness	4. Understand and transform VGI markets by funding and launching data programs, studies and task forces (4.01, 4.03, 4.04, 4.06, and 10.12, 10.13, 10.14, 10.15) 5. Accelerate use of EVs for bi-directional non-grid -export power/public safety power shutoffs (PSPS) (5.01, 5.02, 5.03) 6. Develop EV bi-directional grid-export power including interconnection rules (technology development sub-set of category 6 - 6.03 and 6.07) 7. Fund and launch demonstrations and other activities to accelerate and validate commercialization (7.03, 7.04, 7.05, 7.06, 7.07, 7.09 7.11, 7.13, 7.14)
Adopt standards to enable VGI services	6. Develop EV bi-directional grid-export power including interconnection rules (6.11 re: standards coordination) 8. Develop, approve, and support adoption of other non-interconnection technical standards (includes 8.02 and 1.12, 10.09)
Overcome capital costs, infrastructure, information other barriers and scale VGI services	2. Develop and fund government and utility customer programs, incentives, and DER procurements (2.01, 2.02, 2.03, 2.04/2.17, 2.05, 2.06, 2.07, 2.08, 2.09, 2.11, 2.12, 2.13/2.23, 2.14, 2.15, 2.16, 2.17, 2.18, 2.19, 2.20, 2.21, 2.22, 2.24 and 1.19, 10.10, 10.11) 9. Fund and launch market education & coordination (9.02) 11. Conduct other non-VGI-specific programs and activities to increase EV adoption (11.01, 11.02, 11.03, 11.04, 11.05 and 7.01, 7.02, 8.01)
Agency coordination	10. Enhance coordination and consistency between agencies and state goals (10.01, 10.02, 10.03, 10.04, 10.05, 10.06, 10.07 and 9.01)

The Working Group also provided extensive information regarding potential use cases in response to VGI Working Group Question 1 as shown in the final [VGI Working Group Report](#). Use cases were created based on six aspects such as vehicle type, service provided, approach, whether one actor controls all aspects of charging, and others. Each VGI Working Group policy recommendation references related use cases. (Several recommendations in category 4 of the above table are intended to further improve understanding of use cases including costs and benefits.)

In addition, CARB, CAISO, CEC, CPUC and a group of community choice aggregators provided stocktakes of existing VGI actions (see [VGI Working Group Report](#) A-3).

<sup>1</sup> Energy Division staff grouped each recommendation in the category where it fit best, which in some cases was different from the category identified by the participant in the VGI Working Group that proposed the recommendation.

## Draft Transportation Electrification Framework

Energy Division staff released a draft TEF in February 2020 in Rulemaking (R.) 18-12-006 to catalyze the development of a holistic strategy for how IOUs can best support California's clean transportation and clean energy goals. The draft TEF includes a number of topics that intersect with VGI policy recommendations. For instance, the VGI section (11.1) lists the requirements of Senate Bill (SB) 676 (Bradford, 2019). Other draft TEF sections that are relevant or potentially relevant to the VGI Working Group recommendations include: equity (6); time-of-use (TOU) rates (9); electric vehicle supply equipment technical standards (8.1); emerging technology program (8.5); CALGreen building codes (10.2); market education & outreach (11.2); cybersecurity (8.2); targets and metrics (3.4); near-term priorities including resiliency (5.2) and new building construction (5.5); and others.

## Senate Bill 676

In October 2019, Governor Newsom signed SB 676 (Bradford, 2019) establishing Pub. Util. Code §740.16 that set out the following requirements (and others not listed here):

- §740.16(b)(1): establishes a definition of “electric vehicle grid integration” (or VGI) and grants the CPUC authority to revise this definition if necessary.
- §740.16(c): directs the CPUC to, by December 31, 2020, adopt strategies and quantifiable metrics to maximize the use of feasible and cost-effective electric vehicle grid integration by January 1, 2030 based on specific criteria. §740.16(b)(2) states that VGI “shall not require the use of any specific technology” and “may be achieved using multiple strategies, including, but not limited to, the adoption of an electrical rate design, a technology, or a customer service, if that adoption helps provide net benefits to ratepayers.”
- §740.16(i): requires that each IOU “shall, in each of its load research report compliance filings or alternative compliance filings submitted to the commission, report the electrical corporation’s annual measurable progress in furthering the electric vehicle grid integration strategies adopted pursuant to subdivision (c).”
- §740.16(j): states that the CPUC shall review these IOU reports and may, if appropriate, issue additional future recommendations to ensure reasonable progress toward VGI goals.

An ALJ ruling issued in the DRIVE rulemaking on July 21, 2020, requesting party comments on what strategies and quantifiable metrics the CPUC should establish under SB 676 and how they meet SB 676 statutory criteria.

## VGI Roadmap Update

The CEC is leading a [VGI Roadmap Update](#) with CAISO, CPUC, CARB and stakeholders. This effort stems from the CEC’s 2017 Integrated Energy Policy Report recommendation to update the 2014 California VGI Roadmap to reflect “the needs to use open standards, to return the value of grid integration to stakeholders, and to commercialize prior investments in research and maintain leadership in advanced technology development.” The update will include actions that California can take to advance VGI and help meet the state’s 2025 and 2030 zero-emission vehicle adoption goals. Interested parties are encouraged to participate in this process, which may consider VGI Working Group recommendations that list the CEC as the lead agency as well as other topics (this staff paper does not address action items that are specific to the CEC).

## Energy Division Staff Response to VGI Working Group Policy Recommendations

Table 4 in the Appendix contains the 55 [VGI Working Group policy recommendations](#) that list the CPUC as the lead agency as well as others that list the CPUC as a supporting agency and are related to topic(s) in the draft TEF, as well as the proposed metric(s) if any (the VGI Working Group [surveys](#) and [VGI Working Group policy recommendations](#) database contain more details from the Working Group). The table also includes the following information:

- Open proceedings outside of the DRIVE OIR where interested parties may raise policy recommendation(s) for CPUC consideration (which may require becoming a party).<sup>2</sup>
- Policy recommendations that staff believes are related to topics in the draft TEF and should be considered alongside the original staff draft TEF; staff also identified additional questions regarding these policy recommendations and how they could be implemented for parties to consider when providing comments on the draft TEF.
- Policy recommendations that staff believes are related to topics in the draft TEF but should not be considered at this time. Based on VGI Working Group quantitative rankings, qualitative feedback and other information, staff believes that these recommendations are less urgent and/or require additional development to identify clear action items. Staff recognizes that VGI is a rapidly evolving field. Thus, these recommendations may deserve future consideration after stakeholders and staff learns more about VGI markets and technologies (future evaluation and updates are described later).

## Cross-Cutting Policy Topics

### Cybersecurity

The draft TEF section 8.2 (cybersecurity) proposes to require that IOUs adopt best practices for cybersecurity and implement a cybersecurity gaps analysis and take corrective action where needed. Staff believes that this approach is also relevant to implementation of VGI policy recommendations and has compiled a list of potentially relevant standards development organizations based on informal discussions by interested VGI working group participants including Energy Division staff.<sup>3</sup> Any relevant standards from these organizations should be considered when addressing VGI as part of cybersecurity best practices adoption and the gaps analysis and any corrective action. This list of organizations may not be complete and is not intended to endorse any specific standard(s).

- Canadian Standards Association
- International Organization for Standardization
- Institute of Electrical and Electronics Engineers
- National Institute of Standards and Technology
- Open Charge Point Protocol
- SAE
- Underwriters Laboratory

While the comment deadline on the draft TEF cybersecurity (8.2) section has passed, the SB 676 ruling issued July 21, 2020 allows party comments on cybersecurity.

---

<sup>2</sup> VGI Working Group policy recommendations often include a list of relevant proceedings identified by the author. In many cases staff agrees and in others staff provided updated information.

<sup>3</sup> The VGI Working Group discussed one more of the cross-cutting topic at a VGI Working Group workshop as well as two follow-up conference calls with interested participants.

## Equity

Ensuring that residents of Environmental and Social Justice (ESJ) communities, including disadvantaged communities (DACs) and low- and moderate-income customers, can benefit from VGI implementation strategies (by generating revenue and/or accruing other benefits) is critical to VGI's success. Participation in VGI can also incentivize greater EV adoption within these communities.<sup>4</sup>

The draft TEF contains broad Transportation Electrification equity guidance (section 6). Table 2 below contains Staff's proposed supplemental guidance regarding several types of VGI activities based on informal VGI Working Group stakeholder discussions and staff research. Parties may address these recommendations in comments on draft TEF sections 6 (equity) and/or 11.2 (VGI).

*Table 2: Equity Recommendations*

Potential VGI Activity	Proposed Recommendations
Incentive Programs	<p>Any IOU program(s) that provide rebates to encourage VGI implementation should consider increased incentive levels for ESJ communities. These programs should also engage with community-based organizations to seek their advice on program design and implementation.</p> <p>IOUs should evaluate the potential to leverage EVs deployed by state and local equity programs as a VGI resource to benefit ESJ communities and support California policy goals. CARB identified potential Three-Year Clean Transportation Equity Investments of \$390-\$790 million (note that these estimates were prepared prior to the impacts of COVID-19 pandemic on state government resources).<sup>5</sup> Air Quality Management Districts and the CEC have also adopted equity-focused programs to support EV adoption.</p>
Technology Demonstration	<p>Any IOU-implemented VGI demonstrations could consider the DAC requirements set forth in Assembly Bill (AB) 523 (Reyes, 2017) for CEC demonstrations under the Electric Program Investment Charge (EPIC) program. CEC has met or exceeded goals that at least 25% of CEC EPIC technology demonstration and deployment programs projects are located in and benefit DACs and an additional 10% are located in and benefit low-income communities (<a href="#">EPIC 2019 Annual Report</a>, CEC, p.24). We recognize that individual IOUs set different equity targets in transportation electrification programs due to the characteristics of their specific service territories.</p>
Marketing, Education and Outreach (ME&O)	<p>Customer engagement for DACs and low-income communities is an essential component of implementing ME&amp;O strategies for VGI programs and rates:</p> <ul style="list-style-type: none"> <li>• "...many underserved community members lacked familiarity with how EVs worked." (<a href="#">Electric Vehicles for All: An Equity Toolkit</a>, Greenlining.)<sup>6</sup> VGI programs and rates will likely add additional complexity.</li> <li>• Any planning &amp; implementation of any VGI-focused ME&amp;O program(s) authorized by the CPUC should leverage existing efforts to promote EV adoption in ESJs by state and</li> </ul>

<sup>4</sup> Please see the draft TEF section 6 for description of ESJ communities and DACs.

<sup>5</sup> [CARB Updated Three-Year Plan for CVRP, the ZEV Market, Clean Transportation Equity Investments, and Outreach Appendix C](#) (September 2019).

<sup>6</sup> IOUs will likely need to survey customers to understand customer needs and solutions for ESJ communities such as access to capital for low-income residents, language barriers, and effective outreach channels.



	other agencies and community-based organizations.
--	---

## Metrics

Staff asked VGI Working Group policy recommendation authors to propose metrics during the working group (see these proposed metrics in Table 4) as a benchmark for determining progress. In general, stakeholders did not comment on metrics included in VGI Working Group recommendations nor on gaps where the author did not include any proposed metrics. Parties that comment in support of a recommendation may consider commenting on whether the metrics identified in draft TEF section 3.4 and/or others are appropriate to fill gaps or make corrections or clarifications to metrics (if any) provided by the author of the policy recommendation (see comment opportunities listed in Table 4). Parties may also address in any such comments on VGI Working Group policy recommendation(s) whether metrics for such recommendation(s) should be coordinated with quantifiable metrics that are adopted under SB 676, and if so how.

Interested members of the VGI Working Group identified three categories of metrics relevant to VGI policy recommendations during informal discussions, and parties can consider these categories when providing any comments on the draft TEF regarding metrics. The three categories are: activity; program implementation; and outcomes as shown below in Table 3. Metrics regarding the activity stage may be most appropriate for new programs, tariffs, or rates (i.e. was a program, tariff, or rate adopted). Over time, program implementation metrics may become more relevant. Finally, outcome-based metrics reflect broad progress towards achieving end-goals without differentiating the contribution of any specific action, which may be useful when efforts to implement VGI recommendations scale to the point of achieving significant outcomes.

*Table 3: Categories and Examples of Metrics*

Category	Purpose	Examples (not intended to be comprehensive)
Activity	track adoption	<ul style="list-style-type: none"> <li>Was a new or revised IOU tariff adopted?</li> <li>Was a new or revised rate adopted?</li> <li>Was a new policy or program adopted?</li> </ul>
Program implementation	track success of program implementation against program goals	<ul style="list-style-type: none"> <li>How many customers participated?</li> <li>How many customers were educated?</li> <li>How many demonstrations were implemented?</li> <li>How many EV charging port installations were enabled?</li> </ul>
Outcome	track aggregate progress across all programs and activities	<ul style="list-style-type: none"> <li>How many kilowatt-hours (kWh) or kilowatts (kW) were shifted, shaved or otherwise participated?</li> <li>How many distribution upgrades were avoided?</li> <li>How many tons of greenhouse gases (GHG) were avoided?</li> <li>How many homes/communities have back-up power?</li> <li>How many DAC and/or low-income customer participated?</li> <li>How much revenue was generated to encourage EV adoption by residents and fleet operators?</li> </ul>

## Process for Implementing VGI Near Term Priorities

Staff recognizes that most of the VGI Working Group stakeholder recommendations call for action by 2021. IOUs would file Transportation Electrification Plans (TEPs) under the draft TEF that could serve as the vehicle for implementing policy direction in the draft TEF, but these TEPs would



likely not be filed in time for IOUs to take action on VGI recommendations by 2021. The draft TEF would allow IOUs to request approval for some activities through “pre-TEPs” after the TEF is finalized and prior to full IOU TEPs.<sup>7</sup> IOUs noted during the VGI Working Group that “As the TEF and associated TEP that will be developed may take some time before approval, the IOUs should be allowed to request through an application (or other appropriate process) to have funding set aside in pre-TEP years for VGI/transportation electrification activities.”<sup>8</sup>

Staff suggests that parties consider, when commenting on the VGI section of the draft TEF (11.1), the following:

- What, if any, VGI related topics should be included in the list of pre-TEP topics (see Section 5 of the draft TEF for discussion of pre-TEPs) that could be included as part of a program application or pilot proposal to be filed as a pre-TEPs; and
- What other mechanism(s) currently allow, or could be modified to allow, implementation of the near-term VGI recommendations under the DRIVE OIR? Alternatively, would an alternative proceeding outside of the DRIVE OIR provide sufficient authority in lieu of taking action within the OIR?

We also note that SB 676 established in Pub. Util. Code §740.16(h) that “Each electrical corporation shall, in each of its applications to the commission for transportation electrification programs and investments filed pursuant to Section 740.12, quantify how the investments described in the application are expected to further the electric vehicle grid integration strategies adopted pursuant to subdivision (c).” Parties may wish to consider this SB676 requirement for IOU applications when commenting on the draft TEF regarding how and when IOU VGI policies and strategies should be implemented (the SB 676-related ruling noted earlier is the appropriate venue for comments on how the CPUC should implement SB 676 generally).

## Evaluation Process

Staff recognizes that there is presently insufficient information to determine all of the policies needed to achieve VGI goals. The VGI Working Group report and policy recommendations identify a number of these information gaps (and a number of recommendations to remedy these gaps) and others will become apparent over time.

Staff proposes that one IOU issue a request for proposals (RFP) for third party evaluation of the IOUs VGI implementation to complement IOU annual reports required under §740.16(i) (as noted under SB 676 above) and scorecard reporting under the draft TEF (section 3.4). Staff proposes that the lead IOU develop an RFP scope of work in consultation with staff and the other IOUs; and include staff in the evaluation of bidders in response to the RFP. We also propose that the evaluator provide the draft report to staff for review, and complete the final report in time to publicly release the report four months after the release of the IOUs’ second annual report under SB676 (likely in early 2023 based on SB 676 statutory requirements, though specific timelines have not yet been determined).

---

<sup>7</sup> Section 5 of the draft TEF proposes to allow IOUs to file applications for TE that address “near-term priorities” before filing long-term Transportation Electrification Plans that fully address the planned future final TEF decision.

<sup>8</sup> <https://gridworks.org/materials-produced-by-the-vgi-working-group/> See “Additional comments on policies database”, cell D109.

The evaluator's report would build on, but not duplicate, routine IOU reporting by providing a holistic qualitative evaluation of progress to date; identifying the latest best practices; and identifying other lessons learned such as areas for improvement based on initial experience and/or market or technology changes.<sup>9</sup> This information would inform utility staff, Energy Division staff, and stakeholders of whether the CPUC should consider revisions to policies under the DRIVE OIR (or other proceedings) and/or identify issues requiring future workshops or working groups.

In the longer term, as VGI markets and technologies are better understood, staff proposes that review of progress and updates would primarily occur through routine TEF and IOU TEP updates unless staff find reasons to recommend changes sooner.

Staff suggests that parties include in their comments on the VGI section of the draft TEF (Section 11.1) their opinions on when and how to review progress on VGI including comments on the staff proposal and/or alternative approaches; and the reasons for their proposed approach. Staff also suggests that parties comment on what type of coordination is necessary, if any, between evaluations of VGI programs and evaluations of other TE programs.

---

<sup>9</sup> The scope of work would be developed by all of the IOUs, with drafts and a final version provided to Energy Division staff for review and approval and issued by a lead IOU during the contracting process. Staff proposes that the lead IOU would begin contracting in time for the approval of a workplan within 15 days after the second year of IOU reporting is completed. We believe that this timing will balance allowing time for implementation of VGI strategies so that staff and stakeholders can learn from this experience and see some additional market and technology development trends; and providing timely evaluation information to enable opportunity(s) to make efficient mid-course correction(s) as needed.

# Appendix –VGI Working Group Policy Recommendations and Energy Division Staff Feedback

Table 4: VGI Working Group policy recommendations for the CPUC and Energy Division Staff Feedback

WGI WG#	Policy Action Recommended by WGI WG Stakeholder(s) <sup>10</sup>	Energy Division staff identification of potential venues; and topics related to draft Transportation Electrification Framework	Metrics Proposed by VGI WG Stakeholder(s)
1.01	Rate design for demand charge mitigation to be enabled by stationary battery storage coupled to EV charging	<b>Parties may address whether any change to the rates section of the draft TEF are needed and if so what changes are needed and why in comments on draft TEF section 9.</b> IOU staff informed Energy Division staff that they have adopted (PG&E subscription rate, SCE commercial rates TOU-EV-7 through -9) or proposed (SDG&E Application A19-07-006) rates that replace the coincident peak portion of demand charges with peak period volumetric (per kWh) rates. The SCE rate would transition back to a traditional coincident peak demand charge (based on 15-minute maximum use per month) gradually beginning in 2024. (Non-coincident peak demand related to the cost of serving maximum demand at a specific site is not be incorporated into volumetric rates.)	Increased capacity and capability for EV infrastructure hosting
1.02	EV drivers across all sectors must be guaranteed direct access to their utilities' time-variant (e.g. TOU) rates, which are cost-competitive especially during off-peak periods, in order to both capture the value from currently "favorable" use-cases and unlock the value of currently "unfavorable" use-cases. To achieve this objective, utilities must be allowed the	<b>Staff does not recommend additional near-term action under the DRIVE OIR.</b> 1) Parties have already provided extensive comments on the reasons why the CPUC should or should not allow IOUs to own and operate transportation electrification (TE) infrastructure; or instead provide rebates for host site owned customer-side infrastructure; with regards to draft TEF section 4. The draft TEF does not propose that the ability to offer TOU rates to drivers is sufficient basis for IOU ownership of customer-side TE infrastructure.	EV drivers can expect electric vehicle charging rates to be competitive or similar to the utilities' TOU rates.

<sup>10</sup> Stakeholder recommended policy action descriptions and metrics have not been edited by Energy Division staff for grammar or clarity. Some final comments to the VIG Working Group regarding the descriptions may not be included.

	option to own and/or operate at least a portion of the charging stations across all sectors (e.g. residential, commercial workplace, commercial public destination, commercial public commute, MDHD), so their rates are directly available to EV drivers.	We also note that the CPUC addressed the topic of potential dissonance between a proposed IOU TOU rate for commercial electric vehicles (CEVs) and retail prices set by direct-current fast charger (DCFC) network operators in Decision D.19-10-055 which states “To that end, PG&E shall conduct a representative survey of the prices offered by DCFC operators, workplace EVSE operators, and MUD operators taking service on PG&E’s CEV rates authorized by this decision. The survey results should be presented at the data collection workshop ordered later in this decision. The results of the survey may be used by the Commission in a future proceeding to determine if additional steps should be taken to address the dissonance between the CEV rates and the pricing schemes of the third party EVSE operators.” [citation omitted] (p.32-4) and “Pacific Gas and Electric Company (PG&E) shall convene an informal workshop to share data CEV rate class performance no later than March 1, 2021.” (p76-77)	
1.04	Establish EV TOU rates that don't require separate/submetering (significant customer cost). Allow vehicle data to be used as input to utilities for settlement to customer. Also- having a standardized TOU rate format across IOUs and other LSEs would be helpful [Staff note – LSE means load serving entity]	<b>Staff does not recommend additional near-term action under the DRIVE OIR.</b> Use of vehicle telematics for submetering could be considered in a future phase of the sub-metering protocol development.  Staff notes that IOUs are currently implementing voluntary whole-house TOU rates, which is another alternative to allowing access to TOU rates for EV drivers without requiring submetering via electric vehicle supply equipment.	M&V data to demonstrate participation and compliance vs. whole home TOU [Staff note: M&V commonly refers to measurement & verification]
1.05	The pricing signal received by EV customers (drivers and/or site hosts) at any particular time of day should be relatively consistent (not necessarily identical) across different sectors and price-setting entities, to ensure effective capturing and realization of value from EV flexible load. For example, charging at 2pm within the same geographical region should not be deemed "off-peak" on one IOU rate but "partial-peak" on another IOU rate or CCA rate.	Parties may provide comments on any instances where a CCA and IOU serving the same customer have defined inconsistent peak and partial-peak periods in TOU rates. <b>Parties wishing to comment on rates may do so in comments on draft TEF section 9.</b>  Staff does not have enough information to determine 1) whether any inconsistency in defining TOU time periods has occurred in practice; 2) whether the component of this proposal related to ensuring consistent IOU and CCA rates could be implemented under current rate setting criteria and the CPUC's statutory authority; 3) whether this rate structure would be in the interest of ratepayers or would enable EVs to provide benefits to the grid.	

	Harmonizing different EV rates by different entities, so they are consistent in any given time window, is important for customers to adjust their charging behavior and develop healthy, predictable, and robust charging habits. At the very least, different price-setting entities should agree on the time window where "off-peak" rates apply. [ED staff note: CCA refers to Community Choice Aggregator]		
1.06	The pricing signal received by the EV and that received by the EVSE should be aligned and consistent (not necessarily identical) with one another and should incentivize/deincentivize the same charging/discharging action, to ensure effective capturing and realization of value.	<p><b>Staff does not recommend additional near-term action under the DRIVE OIR.</b></p> <p>Similar to recommendation 1.02, staff does not believe that the CPUC should attempt to implement this type of standardization of business models across different actors in this way at this time. This recommendation could be reconsidered in the future.</p> <p>Please also see 1.02 discussion regarding CPUC Decision D.19-10-055.</p>	
1.07	Create an "EV fleet" commercial rate. Allows C&I customers to switch from a monthly demand charge to a more dynamic rate structure (e.g. average daily demand, dynamic TOU)	See 1.01 re: demand charges. Note that the draft TEF section 9 addresses rates (not specially this type of demand charge structure) and Appendix G lists current rates including current and proposed commercial rates.	<p>Grid impacts: peak kW avoided;</p> <p>Program implementation: % of customers enrolled;</p> <p>Customer benefits: bill savings</p>
1.08	If dynamic rate is unavailable, increase the differential between standard and EV TOU Off-peak Charging rate (delivery portion)	<p><b>Staff does not recommend additional near-term action under the DRIVE OIR.</b> Staff believes that the differential should be established based on the principles in the draft TEF; and <b>any party that agrees or disagrees may provide comments on section 9 of the draft TEF.</b></p>	<p>Grid impacts: peak kW avoided;</p> <p>Program implementation: % of customers enrolled;</p> <p>Customer benefits: bill savings</p>

1.09	Utility tariffs allow for customers with on-site solar and/or storage to utilize commercial EV rates. This would allow commercial customers, particularly transit agencies, to power charging with on-site solar and still take advantage of lower costs available for VGI-specific rates.	Staff understands (see comments in the VGI Working Group policy recommendations <a href="#">database</a> ) that the authors believe that 1) PG&E's NEM2 tariff allows commercial facilities to install PV solar power and storage for commercial EV charging sites to power EV charging and participate in the NEM tariff when solar production does not align with commercial EV charging needs, and 2) SCE's NEM2 tariff does not. <b>Staff suggests that parties comment on 1) whether SCE and SDG&amp;E NEM2 tariffs or other relevant tariffs are more restrictive than PG&amp;E NEM2 and/or other relevant tariffs in terms of allowing commercial customers with PV solar and EVs to participate in NEM tariffs; and 2) if so whether the relevant SCE and SDG&amp;E tariffs should be revised to be consistent with the PG&amp;E tariff and why or why not. Parties may comment on VGI topics in draft TEF section 11.1 and on rates in draft TEF section 9.</b>	Number of charging facilities with VGI rates that have on-site solar/storage installed
1.10	Improve Optional Residential and Commercial TOU rates designed to encourage EVs (e.g., whole house rate), fund outreach to secure 60% level of participation TOU rates designed for EVs with high levels of participation. Optional whole house TOU rates that are better for EVs and the other electricity use (in almost all cases) compared to default TOU rates; similar is true for commercial optional TOU rates; increased utility and non-utility marketing of these optional rates is needed to reach large scale VGI adoption (60% participation rate is two maybe three times current levels for option whole house rates) efforts on the rate, and set target	<b>Parties wishing to provide specific recommendations re: the rate design portion of this recommendations may do so in comments on draft TEF section 9, and should explain why they believe that the draft TEF should be revised to include this recommendation and why or why not. Staff suggests that parties comment on whether the CPUC should set specific TOU rate adoption targets for IOUs, and explain why or why not. Parties may also provide comments regarding marketing, education and outreach regarding draft TEF section 11.2.</b>	
1.11	Develop a rate design and a standard implementation guide for utilities to provide real-time price and event (control) signals to EVSEs, Charging Station	<b>Parties may provide comment regarding the rates section of the draft TEF (section 9) on whether the draft TEF addresses the policy recommendation, and if not what change(s) are needed and why.</b>	

	Management Systems (CSMSs), and EV drivers.		
1.12	<p>Alternative Approaches to Submetering for TE in Homes. Given the many challenges faced by EV submetering over the last decade for homes, a new approach is needed. Eight years ago, when the push for submetering began, attractive time variant rates were not available for homes. Today, residential time variant rates exist and participation rates in them are increasing. As a result, the use of whole house, time variant rates and AMI meters have captured many of the proposed benefits of submetering (e.g. off-peak use of electricity). Whole house rates are applicable for all types of DERs and for DR too, and knowing which appliance provided the export or load shift is not important. The use of whole house rates and meters for all load with all DER's helps minimize costs to the utility by keeping IT processes simple, reduces duplicative networking costs by using the existing AMI meter, and reduces customer confusion and costs especially for low-income customers. Measuring carbon reduction can be done with LCFS incremental credits or other means.</p>	<p>Parties proposing to change the submetering protocol should provide recommendations and supporting information in the submetering venue under the DRIVE OIR.</p>	



1.13	Retail EV charging rates should be reflective of the realistic cost of energy generation, delivery, GHG, and other relevant value streams. Unless proven necessary in select circumstances, all EV charging rates should be time-variant, starting with default TOU rates that contain three or four tiers (super-off-peak; off-peak; partial-peak; peak) to maintain simplicity, and then by enabling optional, more complex alternatives such as dynamic rates that pass through increasingly granular time- and location-specific price signals.	<p><b>ED staff does not recommend additional near-term action under the DRIVE OIR.</b> Staff proposed a framework to transition to default TOU rates and then optional dynamic TOU rates in draft TEF section 9. <b>Parties may provide comments on any section 9 regarding any changes they recommend.</b></p> <p>Please also see 1.02 regarding CPUC Decision D.19-10-055.</p>	EM&V to determine demonstrated benefits against TOU and/or Tiered rate baselines; Retail price of EV charging is progressively more consistent with the grid's wholesale energy prices, congestion conditions, and GHG intensity
1.15	Prompt CPUC approval of time-varying EV rates applications	<b>Interested parties may comment on open proceedings related to TOU rates. (note that an SDG&amp;E application is listed under 1.01 above and Appendix G in the draft TEF).</b>	Percentage of EV site hosts and/or drivers served time-varying rates
1.16	Expand the definition of eligible customer-generator under current NEM tariff option to include customers that own and/or operate EVs and/or EVSE with bi-directional capabilities. In addition to an EV export bill credit (under NEM or another framework), a supplemental credit should be considered for the environmental component, such as one based on similar tools implemented for the SGIP GHG signal to determine marginal emissions rate (i.e., WattTime)	<p><b>Staff suggests that parties comment on the draft TEF sections for rates (9.1) and/or VGI (11.1) regarding whether the CPUC should direct IOUs to create a mechanism to provide value for export of electricity from electric vehicles. For instance, what option(s), if any, should be considered for providing value for exports to the grid? What method(s) should be used to determine compensation levels for exports to the grid, and why? Should the number of customers eligible for such a mechanism be limited, and if so how and why? Parties should identify the advantages and disadvantages of each potential approach and the justification for any ratepayer costs that would result from their proposal. Parties should also identify what changes are within the authority of the CPUC (and whether any existing Decision(s) would need to be changed) or would require statutory changes.</b> (note that this recommendation is related to 1.09 and 1.17)</p> <p>Staff notes that the CPUC will launch a new proceeding regarding NEM (not specific to VGI) this year.</p>	Grid impacts: peak kW avoided; Program implementation: % of customers enrolled; Customer benefits: bill savings

1.17	Create tariffs specific to electric school buses that potentially account for V2G.	<b>Staff does not recommend additional near-term action under the DRIVE OIR.</b> Staff recommends that IOUs initially focus on broader V2G tariffs. Staff recognizes that school buses are a potentially valuable use case with distinctive characteristics (i.e. most school buses are idle during summer months) and that any specific tariff for school buses could be considered later by 2025 as recommended by the author if additional information shows the benefits of a specific approach for school buses.	Lower school utility bills; electric school bus adoption; participation in V2G activity.
1.18	Establish voluntary Critical Peak Pricing tariffs for non-residential charging that pass through reduced TOU rates except during event-based flex alert or critical peak periods, where on-peak hours pass through significantly increased prices. This could include creation of a portfolio of programs spanning a "Rush hour rewards"-style peak time rebate incentive program for EV owners/fleets/EVSPs who respond to utility signal to limit charging during critical peak periods, or a Public Charging incentive/payment or future free charging session for customers that agree to not to charge during critical peak periods.	<b>Staff suggests that parties comment on whether the CPUC should direct IOUs to evaluate a "partially dynamic" rate focused on critical peak periods. Parties are encouraged to address 1) whether this approach would lead to greater adoption of a dynamic (though not fully dynamic) rate compared to fully dynamic rates; and if so why; and 2) the relative benefits compared to a fully dynamic rate. Parties wishing to comment on rates may do so in comments on draft TEF section 9.</b>  The author of this policy recommendation cited the following paper regarding similar programs for thermostats as a precedent to apply this program to EV charging. <a href="https://www.peakload.org/assets/Groupsdocs/PractitionerPerspectives-UtilityBYOTPrograms-022818-Final.pdf">https://www.peakload.org/assets/Groupsdocs/PractitionerPerspectives-UtilityBYOTPrograms-022818-Final.pdf</a>  Staff notes that this recommendation could also be considered during design of demand response programs by IOUs and/or third parties.	Grid impacts: peak kW avoided; Program implementation: % of customers enrolled; Customer benefits: value of revenue to customers
2.01	Require utilities to broadcast signals to a DER marketplace of qualified vendors (curtailment and load)	2.01 and 2.07 are not currently addressed by any existing CPUC proceeding identified by staff (note that they are potentially related to 3.03, and 3.04)	Capacity fulfillment per call
2.02	V2G systems become eligible for some form of SGIP incentives. One or several budget categories for V2G systems could be established along with residential, commercial, equity, etc. Large scale, commercial pilots could be used to develop the program.	An Administrative Law Judge email ruling was issued on July 17, 2020 regarding the pre-hearing conference in R.20-05-012 on July 29, 2020. The ruling included the topic of whether to exclude "Consideration of Electric Vehicles (EV) or EV supply equipment as eligible technologies, beyond existing SGIP processes."	<a href="#">See VGI WG policy recommendations database</a>

2.03	Establish "reverse EE" rebates (pay for performance?) for EVSE installations that build permanent midday load	<p><b>Staff does not recommend additional near-term action under the DRIVE OIR.</b></p> <p>Staff recommends focusing in the near term on incentives such as TOU and dynamic TOU rates listed in draft TEF section 9 that support both this use case, i.e. uptake of mid-day solar, as well as other use cases such as night-time wind and discharge during periods of peak demand. This recommendation could be reconsidered later.</p>	EM&V to determine demonstrated benefits w/r/t negative price abatement, avoided renewables curtailment, and maximizing GHG reduction vis-à-vis gasoline
2.04	Enable customers to elect BTM load balancing option to avoid primary or secondary upgrades, either if residential R15/16 exemption goes away, or as an option for non-residential customers	<p><b>Staff suggests that parties comment on the following topics (regarding section 11.1 of the draft TEF) 1) whether IOUs consider an EV energy management system (EMS) when determining the need for a utility service connection upgrade; or instead sum the maximum nameplate capacity load from each EVSE without considering the EMS (and whether the process set by IOUs for customers that install new load varies based on whether the capacity of the host site's main breakers is increased); 2) whether any barriers would prevent IOUs from offering this technology to participants in existing and future IOU TE infrastructure programs as a "non-wires" alternative to physical upgrades (where otherwise required) to IOU and customer-side electrical capacity; 3) what information and/or demonstrations are needed to evaluate the potential to use EV EMS to manage concentrated loads, such as MD/HD load, to avoid a utility distribution system transformer or feeder upgrade; and 4) other potential barriers and opportunities for EV EMS (same for 2.04/2.17/2.18/2.22, which address one or more of these potential EV EMS applications).</b></p>	Avoidance of reliability events / outages as a result of load balancing
2.05	Require managed charging capability in utility customer programs, incentives, and DER procurements.	This topic was addressed in draft TEF section 8.1 and the comment deadline has passed. Staff notes that VGI WG stakeholders comments include consideration of cost vs. benefits; and that IOUs have separately noted that retrofitting communications capabilities into underground parking can be very expensive. A stakeholder questioned during the VGI WG vetting of recommendations whether this capability should be required across the board when some host sites do not intend to participate in VGI programs.	Participation in customer programs.

2.07	Create a strategic demand reduction performance incentive mechanism, include EVs as technology that can reduce and shift peak demand.	2.01 and 2.07 are not currently addressed by any existing proceeding identified by staff (note that they are potentially related to 3.03, and 3.04)	Implementation of an incentive; actual reductions; avoided costs; measurement by IOUs and CPUC; peak demand reduction.
2.08	The CPUC and CEC should consider coordinated utility and CCA incentives for EVs, solar PV, inverters, battery energy storage, capacity, including panel upgrades, and EV charging infrastructure to support resilience efforts in communities impacted by PSPS events. Coordinated incentives should be designed with resilience and equity in mind, providing the benefits of these technologies to customers directly impacted by PSPS events, as well as CARE/FERA, medical baseline, and/or low-income customers.	Interested parties may participate in the microgrids <a href="#">phase 2 proceeding</a> . The microgrids proceeding (R19-09-009) phase 2 ruling requests comment including staff proposal 4 - IOU microgrid incentives. We note that other programs/proceedings related to renewable energy, TE infrastructure, and energy storage may also be relevant. Parties may also comment on any policies in the draft TEF that are open for comments and related to this recommendation.	Number of utilities that offer "microgrid" incentives; LSEs serving PSPS prone areas offer incentives; customer adoption of clean back-up power (vs. dirty generator).
2.09	Leverage existing pilots in the state to identify major bottlenecks for increasing deployment and reducing costs. Encourage utilities, in partnership with private entities, to establish dedicated programs or sub-programs (under MDHD) for School Bus charging solutions	<b>Staff does not recommend additional near-term action under the DRIVE OIR.</b> This topic is relevant for IOU MD/HD programs; however IOUs can already support school buses and no specific action items were identified in this recommendation (see the <a href="#">VGI Working Group policy recommendations database</a> ). Interested parties can comment on EPIC, IOU TE applications and other relevant proceedings during open comment periods to recommend specific action items and provide supporting information.	
2.11	Create an EV Dealership VGI upfront incentive program whereby utilities can reward dealers for installing or enabling VGI functionality at point of sale. Examples could range from simple to complex: --Charge timer setting + EV TOU sign up (simple) --Service reminder for future charge timer period adjustments (less simple) --Real-time charging settings, with \$/MWh thresholds (more advanced) --Voltage control (even more advanced,	<b>Staff suggests that parties comment on the appropriate process to further evaluate these recommendations.</b> The author notes that this recommendation could be addressed through IOU TE programs; and/or through demand response programs. Draft TEF chapter 11 addresses education and outreach but does not specifically address how to evaluate a potential upfront cash incentive to dealers; or for preprogrammed EVSE.	Grid impacts: peak kW avoided; Program implementation: % of customers enrolled; Customer benefits: bill savings

	enhanced by V2G) --Discounted/rebated home L2 chargers if preprogrammed for defined VGI services (could be cofounded by utility & third party EVSP providers)		
2.12	Allow V1G and V2G to qualify for SGIP to level the playing field with other DERs. An interim step would be for SGIP to fund pilots in various and other LSEs market segments in order to test different incentive payments for V1G and V2G	An Administrative Law Judge email ruling was issued on July 17, 2020 regarding the pre-hearing conference in R.20-05-012 that is to occur on July 29, 2020. The ruling included the topic of whether to exclude "Consideration of Electric Vehicles (EV) or EV supply equipment as eligible technologies, beyond existing SGIP processes"	
2.13	Allow V1G (Smart Charging/Managed Charging) to be counted as storage for Storage Mandate	The current storage mandate is close to completion and staff has not identified a current venue to consider this recommendation.	Number and size of V1G programs. V1G programs support State goals (e.g. RE integration/"Duck Curve Management")
2.14	Prioritize and properly document and implement one or more of the cost-effective use-cases for every transportation electrification plan, project, or program that (1) is supported or subsidized by public funds; (2) is applied at commercial scale (200+ EVs or 100+ EVSEs); and (3) is to be deployed in the next 1-5 years. Every TE program or project meeting the three criteria above must include the deployment of one or more cost-effective VGI use-cases.	<b>Staff does not recommend additional near-term action under the DRIVE OIR.</b> Staff does not agree that plans, projects, and programs should be constrained to use-cases that are determined to be cost-effective. The VGI WG often lacked sufficient data to determine which use cases are cost-effective; and some projects are aimed at moving use cases to the point where they are cost-effective.	Track the total number of use-cases that are being implemented within publicly funded TE programs and projects in California
2.15	Incentive(s) for construction projects with coincident grid interconnection and EV infrastructure upgrade	<b>Staff has proposed in section 10.2 of the draft TEF that IOUs support expansion of CALGreen codes for both new construction - when interconnection would be required for the new building project - and for renovations/expansions of existing buildings that could also require interconnection. Please see recommendation 9.01.</b> (see also recommendations 8.01, 11.05 and 9.01)	Increased charging infrastructure with facility retrofit/upgrade projects

2.17	Enable customers, via Rules 15/16 or any new tariff for EV make-ready infrastructure, to elect certified behind the meter load management technologies to avoid primary and / or secondary upgrades, and make the Point of Common Coupling the focus of capacity assessments rather than the aggregate capacity of individual behind the meter assets such as EVSEs and other DERs. Behind the meter load management systems are proven, UL-certified and NEC-approved solutions that will significantly reduce net economic costs avoiding unnecessary distribution system upgrades. This policy recommendation should ultimately be applied on a technology agnostic basis, but VGI-based upgrade avoidance is a relevant near-term use case that can be implemented as an option for utility EV infrastructure investments.	see 2.04	Higher utilization rates of individual customer connection capacity; avoidance of reliability events; agreement among AHJs that noted UL standards are valid to fulfill NEC 625.4 Automated Load Management Controller definition
2.18	Incentivize multiple EVs using a single charging station (e.g., chargers that power share / sequence) to keep charging load spread across as many vehicles as possible.	see 2.04	
2.19	Site higher level kW charging for commercial applications in the best locations to encourage high utilization	Staff does not believe that this recommendation is relevant to the VGI section (11.1) of the draft TEF.	
2.20	Consider funding opportunities and rate design reform for stationary batteries co-located with DC fast chargers (DCFC) to reap grid benefits and potentially improve economics of near-term DCFC installations with low utilization.	See 1.01 and 1.07 for rate-related aspects. Parties may comment in response to proceedings that they consider relevant regarding IOU funding opportunities for battery storage to support DC FC, including whether this recommendation is related to sections of the draft TEF that are open for public comments.	Upgrades associated with installation decreased, demand charges mitigated after end of 5 year special EV rate currently under consideration, utilities allowed appropriate cost recovery for assessed load considering storage

2.21	Public charger ancillary services program: --Provide a performance-based incentive for building owners, or EVSP providers, who recruit a certain fraction of EV drivers to opt in to allowing their EV to temporarily provide grid services (e.g. regulation) while parked. --Long-term contract through procurement	Parties may provide comments related to any sections of the draft TEF that are open for public comments and are relevant to this idea and/or other venues that they consider appropriate.	Grid impacts: MW of AS delivered
2.22	Non-wires alternative competitive procurement issued (RFO) targeted to EVs/EVSPs that can limit demand during peak times	see 2.04	kW utility service upgrades avoided
3.07	Coordinated effort by state agencies and IOUs and other LSEs to establish market rules and participation options for separately metered V2G customers. Take learnings from existing V2G and other DER pilots and demonstration projects to establish market rules and new utility billing mechanisms that would allow for customers/aggregators to access wholesale market and Resource Adequacy revenues that are unavailable today for any grid exports. Pilot additional demonstration projects to the extent they will result in lasting operational/accounting standards. This will ultimately need to be addressed in CPUC proceedings, likely a new MUA proceeding focused on specific actionable accounting rules rather than the general guidelines that currently exist.	<b>Parties may comment on draft TEF VGI section 11.1 regarding IOU actions needed to open wholesale markets to VGI that should be coordinated through the DRIVE OIR.</b> We note that the author also identified a number of other potential venues to advance this recommendation, including CAISO.	RA from V2G, amount of V2G participating in CAISO markets, equivalent storage capacity provided by V2G, energy arbitrage from V2G



4.03	Explore long-term solutions to mitigate the impact of high kW (10-19 kW) charging in residences as this has disproportionate grid impacts	<b>Staff does not recommend additional near-term action under the DRIVE OIR.</b> Staff believes that other broader solutions to mitigate the impacts of EV charging are a more immediate priority. This topic could be reevaluated in the future based on addition experience if this type of charging becomes more common.	
4.04	Perform detailed cost-effectiveness analysis for specific VGI use-cases in programs/measures that are ratepayer funded, in order to quantify the impact on EV customer, ratepayer, utility, and society at large. Important considerations to guide the implementation of this task include: (1) Cost-effectiveness valuation should include use-cases under both Direct and Indirect approaches. (2) For every use-case: Parties that scored the said use-case as "favorable" are strongly encouraged to support in the detailed cost-effectiveness analysis (while mindful of anti-trust concerns); not providing such support may risk de-favoring and therefore de-prioritizing the said use-case. (3) The VGI cost-effectiveness valuation methodology should be consistent and aligned with the any cost-effectiveness valuation methodology applied to the larger context of TE programs as a whole; VGI measures should not be evaluated in isolation. (4) consider existing cost-effectiveness metrics such as Avoided Cost Calculator and Ratepayer Impact Measure (RIM). (5) ensure only incremental costs of VGI measures are considered.	<b>Staff suggests that parties address whether to include this requirement in comments on draft TEF VGI section 11.1, and if so, how this analysis would be conducted and why. If parties believe it should be included in IOU programs authorized under the TEF, staff encourages comments on how IOUs would collect the relevant cost and benefit data and whether to include in the proposed scorecards or in some other way.</b> We note that VGI Working Group stakeholders commented during informal discussions that the VGI market is generally not sufficiently mature to apply the type of cost-effectiveness metrics applied to some other IOU programs.	Publicly available database of cost-effectiveness of VGI use-cases, similar to the Avoided Cost Calculator

4.06	Large Scale VGI Demonstrations, Data Programs, and Studies Need to be Funded: CalETC's proposal to the CEC to use EPIC funds for an on-going program to convene VGI data experts on a wide array of topics	Stakeholder recommendations 4.06, 6.07, 7.03, 7.04, 7.05, 7.07, 7.09, 7.11 and 7.14 address EPIC. CEC-funding for EPIC projects is currently approved by the CPUC and administered by the CEC, which issues specific requirements for funding solicitations. The assigned Administrative Law Judge released a proposed decision (PD) authorizing continued EPIC funding from 2021-2030 on July 22 under R1910005. The PD also contains a schedule for comments on Phase 2 to focus on administrative and project evaluation improvements. The schedule for opening comments on Phase 2 was not determined as of 7/28/2020. (Note: many demonstrations list the CEC as the lead and CPUC as the secondary lead except that 6.07 lists the CPUC as the lead, and not every stakeholder recommendation lists a lead agency.)	
5.01	Bring automakers to the table to agree to allow limited discharge activity for resilience purposes to be kept under warranty if customers are willing to pay for upgraded bi-directional charging hardware.	<b>Staff does not recommend additional near-term action under the DRIVE OIR.</b> This recommendation could be reconsidered later if market forces do not result in automakers allowing this VGI use case under warrantee. Staff notes that the CPUC does not have authority to regulate automaker warrantee policies.	Number of automakers that allow small amounts of discharge activity under battery warranty; widespread customer ability to discharge battery to home in PSPS event.
5.02	Pilot funding for EV backup power to customers not on microgrids. This includes: (1) Set a state goal (floor) of having EVs providing emergency backup generation during PSPS events: At least 100 EVs by mid 2021 and at least 500 EVs by mid 2022. This could be implemented as one pilot or a portfolio of pilots across California. (2) Utilities to consider the feasibility of EVs for emergency backup generation as part of their PSPS plans and resiliency solutions over the next 2-3 years. Per Recommendation 1, cost-effectiveness shall continue to be a major criteria for evaluating the feasibility of EVs for backup generation.	<p>An Administrative Law Judge email ruling was issued on July 17, 2020 regarding the pre-hearing conference in R.20-05-012 (SGIP) on July 29, 2020. The ruling included the topic of whether to exclude "Consideration of Electric Vehicles (EV) or EV supply equipment as eligible technologies, beyond existing SGIP processes"</p> <p>We understand that several manufacturers intend to introduce EVSE with this capability into the market in the near future.</p> <p>Interested parties may also wish to read the CPUC's Decision <a href="#">D.20-05-051</a> under the Public Safety Power Shutoff (PSPS) OIR (R.18-12-005).</p>	

6.03	Explicitly prioritize these use-cases to be included in the next cycle of PRP submissions by one or more of the IOUs and other LSEs, as well in the next phase of EPIC funding.	<p><b>Staff does not recommend additional near-term action under the DRIVE OIR. Parties may comment on this topic regarding VGI section 11.1 of the draft TEF if they disagree with staff;</b> and may comment on individual IOU TE applications when they are filed.</p> <p>Staff recognizes the value of developing the V2G school bus use cases identified by the author but do not have information to justify ordering IOUs to prioritize these use cases ahead of others. IOUs and other load serving entities LSEs may consider prioritizing these use cases.</p> <p>See 4.06 re: EPIC.</p>	
6.04	Drastically simplify NEM tariffs and streamline NEM applications for EVs; explore possibility for (simplified) NEM tariff specifically for EVs, in order to both capture the value from currently "favorable" use-cases and unlock the value of currently "unfavorable" use-cases. Along the same lines, strongly encourage better communication of EV TOU and NEM rates to the general public and other business entities.	<p><b>See 1.16 regarding availability of NEM tariffs for vehicle export of power to the grid. Staff suggests that parties comment on draft TEF section 9 regarding rates for power exported from vehicles to the grid or draft TEF section 11.1 VGI on whether IOUs should simplify other aspects of NEM tariffs for EVs and if so how and why.</b></p> <p>Please see recommendation 9.02/9.03 for staff feedback regarding market education &amp; outreach.</p>	

6.07	<p>Pilot funding for V1G / V2G for microgrid / V2M solutions. This includes:</p> <p>(1) Set a state goal (floor) of having 10 MW of EVs providing grid services to microgrids, including energy supply, capacity, or others services, in the near-term. One area of consideration would be to test an EV-powered microgrid at community centers in vulnerable communities. (2) Utilities should consider the feasibility of EVs for FTM grid services as part of their PSPS plans and microgrid frameworks.</p>	<p>Interested parties may comment in the following venues:</p> <p>1) CPUC Energy Division Microgrids Rulemaking 19-09-009 July 23, 2020 Ruling. (We note that Staff Proposal 4 "Direct Utilities to Develop a Microgrid Pilot Program" states that "Technology performance criteria: ... Must be able to support multiple loads and meters. Although back up for a single-meter service is not the target, single-meter service may be eligible" p.19. In addition, Proposal 2 could allow transfer of power from one customer to an adjacent "critical customer" during a utility service outage.)</p> <p>2) An Administrative Law Judge email ruling was issued on July 17, 2020 regarding the pre-hearing conference in SGIP R.20-05-012 on July 29, 2020. The ruling included the topic of whether to exclude "Consideration of Electric Vehicles (EV) or EV supply equipment as eligible technologies, beyond existing SGIP processes."</p> <p>3) See 4.06 regarding EPIC.</p>	<p>Progress towards goal of 10 MW of EV microgrid capacity; # VGI assets responding when called and maintaining reliability / keeping the lights on in a PSPS event</p>
7.01	<p>Dedicate specific efforts that allow TNC/Rideshare drivers to reduce their costs by benefiting from utility and other publicly-funded programs and rates, in order to both capture the value from currently "favorable" use-cases and unlock the value of currently "unfavorable" use-cases. This includes, but is not limited to:</p> <p>(1) a clear pathway for TNC/Rideshare to participate in utility programs for commercial charging (DCFC and L2) and to benefit from make-ready infrastructure and charger rebates, including an option for dedicated or semi-dedicated (during specific periods of the day) chargers; (2) a clear pathway for TNC/Rideshare to participate in state-funded programs like CaleVIP; (3) guaranteeing direct access to utility rates for TNC/Rideshare drivers</p>	<p><b>1) Parties may comment on section 12.1 of draft TEF section regarding TNCs</b> including any barriers that TNCs currently face for participation in IOU programs, and what specific changes they would recommend and why. Staff noted in the draft TEF section 11 that TNCs are currently utilizing public DC FC extensively.</p> <p>2) CaleVIP is administered by the CEC.</p> <p>3) See 1.02 regarding guaranteeing access to utility rates.</p>	

	reliant on public charging, per Recommendation 11.0		
7.03	Leverage EPIC funding to pilot some use-cases in order to: (1) better understand realistic costs and implementation challenges; (2) identify concrete ways to reduce cost and streamline implementability. The pilots would cover both sectors Workplace and MUD. Among other activities: strongly endorse the "Distributed Energy Resource Solutions for Medium- and Heavy-Duty Electric Vehicle Charging" initiative launched by the CEC.	See 4.06 regarding EPIC.	
7.04	Create pilots to demonstrate V2G's ability to provide the same energy storage services as stationary systems. Additionally, let V2G systems participate in pilots for stationary energy storage. These pilots would utilize, commercially deployed V2G systems - see "Group A" use cases in recommendation #1.0 The purpose of the pilots is test V2G effectiveness in performing grid applications which are not currently accessible. These new "stackable" applications would be added to and complement base applications such as customer bill management which are accessible today.	See 4.06 regarding EPIC.  <b>Parties may comment regarding the VGI section 11.1 of the draft TEF if they believe that this recommendation should be addressed in the final TEF decision in some way, and if so how and why.</b>	Number of economically viable, accessible grid applications available to V2G systems
7.05	Special programs and pilots for Municipal fleets to pilot V2G as mobile resiliency. V2G has particular value for municipal fleets as a mobile, resiliency response asset. This includes resiliency use cases and other use cases not contemplated in this work group such as ones related to disasters and emergencies. These could be piloted in a similar context as described in recommendation #2.	See 4.06 regarding EPIC.  <b>Parties may comment regarding the VGI section 11.1 of the draft TEF if they believe that this recommendation should be addressed in the final TEF decision in some way, and if so how and why.</b>	V2G system in municipal fleets

7.07	Develop a demonstration pilot that defines a means, based on existing open standards, that allows Aggregators, EV Network Providers and Charge Station Operators to dynamically map the capacity and availability of EVSE resources to local coordination areas – from transformer to feeder to substation.	See 4.06 regarding EPIC.  <b>Parties may comment regarding the VGI section 11.1 of the draft TEF if they believe that this recommendation should be addressed in the final TEF decision in some way, and if so how and why.</b>	
7.09	Large Scale Demonstrations, Data Programs, and Studies Need to be Funded: CalETC's VGI Acceleration proposal to CEC to fund California agencies to select many promising complex VGI use cases for large scale demonstrations that will accelerate adoption and help automakers and charging networks make business decisions to commercialize VGI	See 4.06 regarding EPIC.  <b>Parties may comment regarding the VGI section 11.1 of the draft TEF if they believe that this recommendation should be addressed in the final TEF decision in some way, and if so how and why.</b>	
7.11	Large Scale Demonstrations, Data Programs, and Studies Need to be Funded: study to understand of the impact on the grid from TE in out to 2040	See 4.06 regarding EPIC.	
7.13	Create a mechanism which allows for quick approval of demonstrations for technology and to determine market interest	Staff proposed that IOUs adopt an Emerging Technology program in the draft TEF (section 8.5). <b>Staff suggests that parties comment, in response to VGI section 11.1 of the draft TEF, on whether the scope of an Emerging Technology program (if adopted in a final CPUC decision on the TEF) should include these types of VGI demonstrations and market support, and if so what type of budget is appropriate for these activities and why.</b> (Parties can cross-reference and should not repeat comments on section 8.5)	Take a demo and test proposal from idea to execution in 2 quarters
7.14	Increased pilots exploring shared charging infrastructure for commuter-based fleets, both public and private. This should include medium distance transit commuter buses that operate in morning and afternoon/evening as well as the growing fleet of tech company and other corporate shuttles. Pilots should include	See 4.06 regarding EPIC.	kWh shifted, GHG emissions saved, curtailment avoided, charger cost savings

	provisions for managed charging and potential provision of market services and V2G.		
8.01	Incentives for Title 24 new construction -- MUDs and some C&I (especially workplace and large destination) parking facilities	See 9.01 regarding CALGreen.  We also note that the draft TEF section 5.5 proposed new construction incentives; the deadline for party comments on this section of the draft TEF has passed. (note that VGI WG recommendations 8.01 and 11.05 are similar recommendations for different types of parking facilities.)	Increased charging infrastructure at MUDs and residential
8.02	Finalize submetering protocols/standards to increase accessibility to more favorable EV TOU rates.	Sub-metering protocols are currently being considered in the DRIVE OIR.	Sub-meters utilized, number of customers with access to commercial EV rates
9.01	Optimize CALGreen codes for VGI and revise to require more PEV-ready parking spaces and expand to existing buildings. For buildings that go significantly above the requirements, incentives can be made available, similar to the California Advanced Homes Partnership.	Staff proposed in section 10.2 of the draft TEF that IOUs support state agencies developing CALGreen updates. Staff <b>suggests that parties comment on whether IOUs should support CALGreen updates as proposed in the draft TEF and whether IOU support is needed for any research or analysis on whether technical standards revisions would optimize these codes to support VGI.</b>	Reduced cost per charger; Increased charging infrastructure at MUDs and residential; Fraction of chargers in new buildings that have smart charging. Meeting state goals for EV infrastructure.
9.03	Through TE plans, utilities develop coordinated ME&O budgets to inform EV customers of the lower cost of fueling EVs using dynamic rate options and other VGI opportunities. This ME&O for VGI ramps up in tandem with overall TE efforts.	<b>Staff suggests that parties comment on draft TEF section 11.2, Marketing Education &amp; Outreach (ME&amp;O) to 1) identify potential budget ranges for VGI-related ME&amp;O and explain why; 2) identify examples of effective VGI ME&amp;O strategies and/or research needed to determine appropriate strategies; and 3) explain the potential role(s) for IOUs in these efforts and why the IOU role(s) is appropriate.</b>	Increased awareness, determined through customer awareness and satisfaction surveys, by the general public of VGI and its benefits to individual consumers, including benefits such as GHG reduction.



10.01	Helping the state meet federal air quality requirements and the state's 2045 carbon neutrality requirement is a top-level need and VGI is a secondary goal that should be used to help achieve these primary goals. Similarly TE and related infrastructure must be optimized for the primary purpose of providing transportation and VGI solutions ought to be designed to satisfy that primary purpose	Staff agrees with the goal of achieving air quality requirements and climate goals and the importance of TE adoption to meet these goals. These goals are established in existing legislation.	
10.02	Use the proposed Joint IOU VGI Valuation Framework (6 dimensions) and associated use-cases to reference, articulate, and communicate about VGI in policymaking across CA state agencies. The 6 dimensions (Sector, Application, Type, Approach, Resource Alignment, and Technology) can be used as a starting point to reference specific VGI use-cases, with additional details added as necessary. Specifically, strong recommendation to use the Joint IOU VGI Valuation Framework as the foundational framework for VGI in the Transportation Electrification Framework under the DRIVE OIR.	The draft TEF section VGI section 11.1 does not address specific use cases. <b>Parties may comment on how discussion of specific use cases is necessary to meet VGI goals in comments on the VGI section (11.1) of the draft TEF.</b>	
10.04	State agencies coordinate and maintain consistency across the different policy forums (see CalETC letter) and state policy goals	Staff will continue to coordinate with other state agencies.	

11.01	Reduce or eliminate demand charges for DCFC, but scale up with utilization to create more demand-responsive rate.	PG&E and SCE tariffs waive peak demand charges on a permanent or temporary basis but not co-coincident demand. <b>Parties may comment on draft TEF section 9 regarding rates regarding whether they believe that any change is needed.</b> (Note: see 1.01 and 1.07 regarding stakeholder recommendations on converting coincident monthly demand changes into more flexible policies.	DCFC installs; DCFC utilization; managed charging benefits.
11.03	Permit streamlining	Staff recognizes that some building officials have limited knowledge of VGI technologies and practices, which could create barriers to local government permitting of VGI solutions. <b>Staff suggests that parties comment on draft TEF section 10.3 (partnerships) regarding what, if any, IOU activities should support local permitting (such as creation and/or presentation of technical resources regarding VGI) and why.</b> Staff believes that any potential IOU role would require carefully coordinated to avoid overlaps with 1) current efforts by the Governor's Office of Business Development (GO-Biz), 2) efforts by those CCAs that are currently working with local building officials, 3) and any future CEC grant funding for this activity. (CEC has previously provided funding through EV-readiness grants).	Permits that get processed vs permits denied  Processing time
11.04	Investigate ADA and other obstacles to charger installation at MUDs and some high density C&I locations	<b>Staff does not recommend additional near-term action under the DRIVE OIR.</b> The California Division of the State Architect is the lead state agency writing these regulations, which are implemented by local jurisdictions. <b>Parties that recommend a specific action for IOUs could comment on draft section 10 of the TEF, Partnerships to identify what IOU role is necessary and why.</b>	Uptake of MUDs in IOUs programs, e.g., >10%
11.05	Incentives for new construction -- public parking lot projects	see 8.01	Increased charging infrastructure at public parking lots